AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. **(currently amended)** An apparatus to be connected between a network access unit and a network to be protected, for protecting legitimate traffic from DoS (denial of service) and DDoS (distributed denial of service) attacks, said apparatus comprising:

a high-priority queue;

a low-priority queue;

a queue information table having, for each specific STT (source-based traffic trunk),

previous load information, and

a service queue for a specific packet having the specific STT, wherein the service queue is the high-priority queue or the low-priority queue;

a packet classifier for ~~receiving a packet from the network access unit, searching the queue information table for a service queue associated with an STT of the received packet, selectively transferring the received packet to the high priority queue or the low priority queue in accordance with the service queue, ;~~

(a) obtaining an STT of a packet received from the network access unit based on a source IP address of the received packet ;

(b) searching the queue information table for the service queue corresponding to the STT of the received packet and checking, by the packet classifier, whether the service queue is the high-priority queue or the low-priority queue;

(c) transferring the received packet to the high-priority queue if the

service queue is the high-priority queue in the step (b);

(d) transferring the received packet to the low-priority queue if the service queue is the low-priority queue in the step (b); and

(e) transferring packet information on the received packet to a queue coordinator;

[[a]] said queue coordinator for ~~receiving information on the received packet from the packet classifier, and updating the service queue associated with the STT of the received packet in the queue information table based on (i) a load of the received packet and (ii) the previous load information stored in the queue information table in association with the STT of the received packet; and~~

(f) updating the service queue associated with the STT of the received packet in the queue information table, wherein said updating is based on (i) a load of the received packet and (ii) the previous load information stored in the queue information table in association with the STT of the received packet;

wherein said updating at (f) comprises:

(a') calculating an average load of the STT of the received packet based on the packet information transferred from the packet classifier;

(b') selectively resetting the service queue associated with the STT of the received packet depending on the calculated average load of the STT of the received packet; and

(c') storing the selectively reset service queue in the queue information table; and

wherein said selectively resetting at (b') further includes:

(b'1) setting the service queue associated with the STT of the received packet to be the low-priority queue if the calculated average load of the STT of the received packet is greater than an allowable load when the high-priority queue is in a congested state;

(b'2) randomly choosing a first STT, which uses the low-priority queue, from the queue information table if the service queue associated with the STT of the received packet is the high-priority queue;

(b'3) following the step (b'2), setting a service queue associated with the randomly chosen first STT to be the high-priority queue and the service queue associated with the STT of the received packet to be the low-priority queue if the average load of the STT of the received packet is greater than that of the randomly chosen first STT;

(b'4) randomly choosing a second STT, which uses the high-priority queue, from the queue information table if the service queue associated with the STT of the received packet is the low-priority queue; and

(b'5) following the step (b'4), setting the service queue associated with the STT of the received packet to be the high-priority queue and a service queue associated with the randomly chosen second STT to be the low-priority queue if the average load of the STT of the received packet is smaller than that of the randomly chosen second STT; and

a buffer for buffering outputs of the high-priority queue and the low-priority queue and providing the buffered outputs to the network to be protected.

2. (original) The apparatus of claim 1, wherein the network to be protected comprises a server.

3. (previously presented) The apparatus of claim 1, wherein the information on the received packet includes a packet size, a packet arrival time and an STT index representing the STT of the received packet.

4. (previously presented) The apparatus of claim 1, wherein the queue information

table has fields including:

an STT ID field,

a service queue field,

an average load field,

a recent load calculation time field, and

a total packet size field.

5. (previously presented) The apparatus of claim 1, wherein a maximum load of both the high-priority queue and the low-priority queue is set to be a maximum allowable load of the network to be protected.

6. (original) The apparatus of claim 5, wherein the network to be protected comprises a server.

7. (canceled)

8. **(currently amended)** The method of claim [[7]] 13, wherein the network to be protected comprises a server.

9. (canceled)

10. **(currently amended)** The method of claim [[9]] 13, wherein the step (e') further comprises:

storing a modified average load in the queue information table.

11. **(currently amended)** The method of claim [[9]] 13, wherein the step (a') further includes the steps of:

(a'1) calculating a total packet size based on the packet information transferred from the packet classifier;

(a'2) checking whether it is time to recalculate the average load;

(a'3) if it is time to recalculate the average load in the step (a'2), calculating a new average load by using (i) a previous average load and (ii) a current average load based on the total packet size, and then proceeding to the step (b'); and

(a'4) if it is not time to recalculate the average load, proceeding to the step (b').

12. (previously presented) The method of claim 11, wherein the packet information includes a packet size, a packet arrival time, and an STT index corresponding to the STT of the received packet.

13. **(currently amended)** A method of protecting legitimate traffic from DoS (denial of service) and DDoS (distributed denial of service) attacks, said method being performed by an apparatus which is connected between a network access unit and a network to be protected and which includes:

a queue information table having, for each specific STT (source-based traffic trunk),

previous load information, and

a service queue for a specific packet having the specific STT, wherein the service queue is a high-priority queue or a low-priority queue,

a queue coordinator, and

a packet classifier,

the method comprising the steps of:

(a) obtaining, by the packet classifier, an STT of a packet received from the network access unit based on a source IP address of the received packet ;

(b) searching, by the packet classifier, the queue information table for the service queue corresponding to the STT of the received packet and checking, by the packet classifier, whether the

service queue is the high-priority queue or the low-priority queue;

(c) transferring, by the packet classifier, the received packet to the high-priority queue if the service queue is the high-priority queue in the step (b);

(d) transferring, by the packet classifier, the received packet to the low-priority queue if the service queue is the low-priority queue in the step (b);

(e) transferring, by the packet classifier, packet information on the received packet to the queue coordinator; and

(f) updating, by the queue coordinator, the service queue associated with the STT of the received packet in the queue information table, wherein said updating is based on (i) a load of the received packet and (ii) the previous load information stored in the queue information table in association with the STT of the received packet;

wherein the step (f) comprises the following steps performed by the queue coordinator :

(a') calculating an average load of the STT of the received packet based on the packet information transferred from the packet classifier;

(b') selectively resetting the service queue associated with the STT of the received packet depending on the calculated average load of the STT of the received packet;

(c') calculating an average load of the high-priority queue;

(d') selectively resetting a service queue associated with a certain STT depending on the calculated average load of the high-priority queue; and

(e') storing the selectively reset service queue in the queue information table; and

~~The method of claim 9,~~ wherein the step (b') further includes the steps of:

(b'1) setting the service queue associated with the STT of the received packet to be the low-priority queue if the calculated average load of the STT of the received packet is greater than an allowable load when the high-priority queue is in a congested state;

(b'2) randomly choosing a first STT, which uses the low-priority queue, from the queue information table if the service queue associated with the STT of the received packet is the high-priority queue;

(b'3) following the step (b'2), setting a service queue associated with the randomly chosen first STT to be the high-priority queue and the service queue associated with the STT of the received packet to be the low-priority queue if the average load of the STT of the received packet is greater than that of the randomly chosen first STT;

(b'4) randomly choosing a second STT, which uses the high-priority queue, from the queue information table if the service queue associated with the STT of the received packet is the low-priority queue; and

(b'5) following the step (b'4), setting the service queue associated with the STT of the received packet to be the high-priority queue and a service queue associated with the randomly chosen second STT to be the low-priority queue if the average load of the STT of the received packet is smaller than that of the randomly chosen second STT.

14. **(currently amended)** The method of claim [[9]] 13, wherein the step (c') further includes the steps of:

(c'1) determining whether the service queue associated with the STT of the received packet after the selective resetting in the step (b') is the high-priority queue or the low-priority queue ;

(c'2) calculating a total packet size served through the high-priority queue if the service queue associated with the STT of the received packet is the high-priority queue;

(c'3) calculating the average load of the high-priority queue if it is time to recalculate the average load of the high-priority queue; and

(c'4) proceeding to the step (d').

15. **(currently amended)** A method of protecting legitimate traffic from DoS (denial of service) and DDoS (distributed denial of service) attacks, said method being performed by an apparatus which is connected between a network access unit and a network to be protected and which includes:

a queue information table having, for each specific STT (source-based traffic trunk),

previous load information, and

a service queue for a specific packet having the specific STT, wherein the service queue is a high-priority queue or a low-priority queue,

a queue coordinator, and

a packet classifier,

the method comprising the steps of:

(a) obtaining, by the packet classifier, an STT of a packet received from the network access unit based on a source IP address of the received packet ;

(b) searching, by the packet classifier, the queue information table for the service queue corresponding to the STT of the received packet and checking, by the packet classifier, whether the service queue is the high-priority queue or the low-priority queue;

(c) transferring, by the packet classifier, the received packet to the high-priority queue if the service queue is the high-priority queue in the step (b);

(d) transferring, by the packet classifier, the received packet to the low-priority queue if the service queue is the low-priority queue in the step (b);

(e) transferring, by the packet classifier, packet information on the received packet to the queue coordinator; and

(f) updating, by the queue coordinator, the service queue associated with the STT of the received packet in the queue information table, wherein said updating is based on (i) a load of the received packet and (ii) the previous load information stored in the queue information table in association with the STT of the received packet;

wherein the step (f) comprises the following steps performed by the queue coordinator :

(a') calculating an average load of the STT of the received packet based on the packet information transferred from the packet classifier;

(b') selectively resetting the service queue associated with the STT of the received packet depending on the calculated average load of the STT of the received packet;

(c') calculating an average load of the high-priority queue;

(d') selectively resetting a service queue associated with a certain STT depending on the calculated average load of the high-priority queue; and

(e') storing the selectively reset service queue in the queue information table; and

~~The method of claim 9,~~ wherein the step (d') includes the steps of:

(d'1) obtaining the calculated average load of the high-priority queue from the step (c');

(d'2) randomly choosing one STT, which uses the high-priority queue, and setting a service queue of the randomly chosen STT to the low-priority queue if the calculated average load of the high-priority queue indicates that the high-priority queue is in a congested state;

(d'3) randomly choosing one STT, which uses the low-priority queue, and setting a service queue of the randomly chosen STT to the high-priority queue if the calculated average load of the high-priority queue indicates that the high-priority queue is in an idle state; and

(d'4) proceeding to the step (e') if the calculated average load of the high-priority queue indicates that the high-priority queue is in a stable state or when one of the steps of (d'2) and (d'3) is performed.

16. (canceled)

17. **(currently amended)** A method of protecting legitimate traffic from DoS (denial of service) and DDoS (distributed denial of service) attacks, said method being performed by an apparatus which is connected between a network access unit and a network to be protected and which includes:

a queue information table having, for each specific STT (source-based traffic trunk),

previous load information, and

a service queue for a specific packet having the specific STT, wherein the service queue is a high-priority queue or a low-priority queue,

a queue coordinator, and

a packet classifier,

the method comprising the steps of:

(a) obtaining, by the packet classifier, an STT of a packet received from the network access unit based on a source IP address of the received packet ;

(b) searching, by the packet classifier, the queue information table for the service queue corresponding to the STT of the received packet and checking, by the packet classifier, whether the service queue is the high-priority queue or the low-priority queue;

(c) transferring, by the packet classifier, the received packet to the high-priority queue if the service queue is the high-priority queue in the step (b);

(d) transferring, by the packet classifier, the received packet to the low-priority queue if the service queue is the low-priority queue in the step (b);

(e) transferring, by the packet classifier, packet information on the received packet to the queue coordinator; and

(f) updating, by the queue coordinator, the service queue associated with the STT of the received packet in the queue information table, wherein said updating is based on (i) a load of the received packet and (ii) the previous load information stored in the queue information table in association with the STT of the received packet;

wherein the step (f) comprises the following steps performed by the queue coordinator:

(a') calculating an average load of the STT of the received packet based on the packet information transferred from the packet classifier;

(b') selectively resetting the service queue associated with the STT of the received packet depending on the calculated average load of the STT of the received packet; and

(c') storing the selectively reset service queue in the queue information table; and

~~The method of claim 16,~~ wherein the step (b') further includes the steps of:

(b'1) setting the service queue associated with the STT of the received packet to be the low-priority queue if the calculated average load of the STT of the received packet is greater than an allowable load when the high-priority queue is in a congested state;

(b'2) randomly choosing a first STT, which uses the low-priority queue, from the queue

information table if the service queue associated with the STT of the received packet is the high-priority queue;

(b'3) following the step (b'2), setting a service queue associated with the randomly chosen first STT to be the high-priority queue and the service queue associated with the STT of the received packet to be the low-priority queue if the average load of the STT of the received packet is greater than that of the randomly chosen first STT;

(b'4) randomly choosing a second STT, which uses the high-priority queue, from the queue information table if the service queue associated with the STT of the received packet is the low-priority queue; and

(b'5) following the step (b'4), setting the service queue associated with the STT of the received packet to be the high-priority queue and a service queue associated with the randomly chosen second STT to be the low-priority queue if the average load of the STT of the received packet is smaller than that of the randomly chosen second STT.

18. (previously presented) The method of claim 17, wherein the step (f) further comprises the following steps performed by the queue coordinator after the steps (a') and (b') and before the step (c'):

(d') calculating an average load of the high-priority queue; and

(e') selectively resetting a service queue associated with a certain STT depending on the calculated average load of the high-priority queue.

19. (previously presented) The method of claim 18, wherein the step (e') includes the steps of:

(e'1) obtaining the calculated average load of the high-priority queue from the step (d');

(e'2) randomly choosing one STT, which uses the high-priority queue, and setting a service queue of the randomly chosen STT to the low-priority queue if the calculated average load of the high-priority queue indicates that the high-priority queue is in a congested state;

(e'3) randomly choosing one STT, which uses the low-priority queue, and setting a service queue of the randomly chosen STT to the high-priority queue if the calculated average load of the high-priority queue indicates that the high-priority queue is in an idle state; and

(e'4) proceeding to the step (c') if the calculated average load of the high-priority queue indicates that the high-priority queue is in a stable state or when one of the steps of (e'2) and (e'3) is performed.

20. (previously presented) The method of claim 19, wherein the step (d') further includes the steps of:

(d'1) determining whether the service queue associated with the STT of the received packet after the selective resetting in the step (b') is the high-priority queue or the low-priority queue;

(d'2) calculating a total packet size served through the high-priority queue if the service queue associated with the STT of the received packet is the high-priority queue;

(d'3) calculating the average load of the high-priority queue if it is time to recalculate the average load of the high-priority queue; and

(d'4) proceeding to the step (e').

21. **(new)** The apparatus of claim 1, being a networked computer system.

22. **(new)** The apparatus of claim 1, further comprising at least a network interface for network connection to the network access unit and the network to be protected.

23. **(new)** The method of claim 13, wherein the apparatus is a networked computer system.

24. **(new)** The method of claim 13, wherein the apparatus further comprises at least a

network interface in network connection with the network access unit and the network to be protected.